

REMARKS

Applicants request reconsideration of the present application. Claims 1-18 are currently pending, with claims 1, 4, 5, 9, 11, 12, 14 and 15 having been amended. Claims 1 and 5 are independent. Support for amendments made herein may be found, for example, pages 15-17 of the specification.

REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The Examiner rejects claims 1-18 under 35 U.S.C. § 112, second paragraph. Applicants have amended claims 1, 4, 5, 9, 11, 12, 14 and 15, taking into account the Examiner's comments. In addition, Applicants provide the following comments.

As illustrated in Figures 2(a) through 2(e), a lens surface may be formed by the gravitational force acting on the resin, and the surface tension of the resin. The "dead weight" may refer to, for example, the weight of the resin itself under the force of gravity. According to at least one example embodiment of the present invention, a pre-lens may be formed by the weight and surface tension of the second resin. In hardening the second resin, the shape of the lens surface is appropriately adjusted, for example, by tilting the connector.

A BRIEF DISCUSSION OF AN EXAMPLE EMBODIMENT OF THE PRESENT INVENTION

According to at least one example embodiment of the present invention, the lens shape is controlled taking into account alignment errors of the optical fiber with respect to the outer diameter of the connector. Conventionally, optical fiber connectors require that fiber be accurately aligned on the center of

the connector main body. Any misalignment shifts the optical axis of the fiber and collimating light may not be obtained. However, such fiber alignment may be difficult, and the alignment accuracy of the fiber may be poor. That is, conventional optical fiber connectors have alignment errors.

By contrast, example embodiments of the present invention provide collimating light even if alignment accuracy of the fiber is poor. In at least one example embodiment of the present invention, a lens may be formed by hardening the second resin. The wavefront of the second resin may be measured to determine any shifting of a focus position. Shifting of a focus position may be caused by alignment errors of the fiber (e.g., shifting of the optical axis of the fiber). Thus, the second resin may be hardened to correct such shifting of the optical axis and form the lens. The shift of the optical axis may be corrected, for example, by tilting the connector main body prior to hardening the second resin. This may cause the surface shape of the second resin (e.g., the lens surface) to change due to the weight of the second resin.

When hardening the second resin, the second resin is hardened while measuring a wavefront aberration. For example, the surface shape of the second resin may be changed until there is no shift. After the correction, the second resin is hardened. In this manner, correction may be made to the lens surface such that any shift is excluded. That is, for example, the lens surface may be formed taking into account alignment errors of the fiber.

As described above, at least one example embodiment of the present invention controls the lens shape using the gravitational force acting on the

second resin. Thus, even when there are alignment errors in the fiber due to poor alignment accuracy, correction may be made to the lens surface, taking into account such errors, and the optical fiber connector may provide collimating light. Furthermore, at least one example embodiment of the present invention provides a connector main body by coupling pipes together. Conventionally, simply coupling pipes to provide a connector main body may not be enough to provide a sufficient level of alignment accuracy of the fiber. As a result, it has not been possible to use such a connector main body. According to at least one example embodiment of the present invention, the lens shape may be controlled using the gravitational force acting on the second resin, and therefore, may allow for use of such a connector main body.

PRIOR ART REJECTION OF CLAIMS 1-5 UNDER 35 U.S.C. § 102(B)

The Examiner rejects claims 1-5 under 35 U.S.C. § 102(b) as allegedly being anticipated by Japanese Patent Abstract of Japan 2002/0040271 ("271 Patent") or U.S. Patent No. 4,779,947 ("Ito"). This rejection is respectfully traversed.

I. THE ABOVE REJECTION SHOULD BE WITHDRAWN BECAUSE ITO FAILS TO TEACH OR SUGGEST ALL FEATURES OF CLAIM 1.

The above rejection should be withdrawn because Ito fails to teach or suggest at least, "a resin injection portion located at a front end of the optical fiber and having a first resin and a second resin formed therein, the first resin forming a lens body, and the second resin forming a lens surface," as set forth in claim 1. Anticipation of claim 1 can only be established only if each and every feature, limitation or element set forth in the claim 1 is found, either

expressly or inherently described in Ito. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); M.P.E.P. § 2131. So long as at least one feature or element of claim 1 is not described in Ito, Ito cannot anticipate claim 1.

According to FIG. 1 of Ito, an optical fiber 10 comprises a fiber element 12 and a nylon jacket 14 for covering the fiber element 12. A forward end of the fiber element 12 is coupled to one end of a rod lens 18 by an adhesive agent. The optical fiber element 12 is fixed in an optical fiber fixing section 20. Within the fiber fixing section 20, part of the optical fiber element 12 and part of the optical fiber 10 are inserted into and adhered to a protective sleeve 24 by an adhesive agent 22. One end of the protective sleeve 24 is inserted into an end of the connecting sleeve 26 and bonded thereto by adhesive agent 28. The connecting sleeve 26 is fixed at its other end to a block 30 capable of transmitting light. Another end of the rod lens 18 is fixed to the block 30.

However, Ito fails to teach or suggest at least, "a resin injection portion located at a front end of the optical fiber and having a first resin and a second resin formed therein, the first resin forming a lens body, and the second resin forming a lens surface," as set forth in claim 1. Ito only mentions one lens, the rod lens 18, and is silent with regard to any composition associated therewith. Therefore, Ito fails to anticipate claim 1 because Ito fails to teach or suggest all features of claim 1.

II. THE ABOVE REJECTION SHOULD BE WITHDRAWN BECAUSE THE '271 PATENT FAILS TO TEACH OR SUGGEST ALL FEATURES OF CLAIM 1.

The above rejection should be withdrawn because the '271 Patent fails to teach or suggest at least, "a resin injection portion located at a front end of the optical fiber and having a first resin and a second resin formed therein, the first resin forming a lens body, and the second resin forming a lens surface," as set forth in claim 1. As discussed above, anticipation of claim 1 can only be established only if each and every feature, limitation or element set forth in the claim 1 is found, either expressly or inherently described in the '271 Patent. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); M.P.E.P. § 2131. So long as at least one feature or element of claim 1 is not described in the '271 Patent, the '271 Patent cannot anticipate claim 1.

The '271 patent is directed to a structure in which an optical filler 15 is provided in an end surface of the optical fiber 1. The optical fiber 1 is optically connected to the optical filler 15. While the '271 patent arguably discloses an optical fiber connector including a resin injection portion (i.e., the portion in which the optical filler 15 is provided), the '271 patent discloses only a single optical filler 15 being formed therein. Therefore, the '271 Patent fails to anticipate claim 1 because the '271 does not disclose or suggest at least, "a resin injection portion located at a front end of the optical fiber and having a first resin and a second resin formed therein, the first resin forming a lens body, and the second resin forming a lens surface," as set forth in claim 1. Withdrawal of this rejection is requested.

Neither Ito nor the '271 Patent anticipate claim 5 for at least reasons somewhat similar to those set forth above with regard to claim 1. Withdrawal of the rejection of claims 1 and 5 is requested because both Ito and the '271 Patent fail to anticipate claim 1 or 5. The rejection of claims 2-4 should be withdrawn at least by virtue of their dependency from claim 1.

PRIOR ART REJECTION OF CLAIMS 5-18 UNDER 35 U.S.C. § 103(A)

The Examiner rejects claims 5-18 under 35 U.S.C. § 103(a) as allegedly being anticipated by the '271 Patent or Ito in view of U.S. Patent No. 6,406,196 ("Uno"). This rejection is respectfully traversed.

I. THE ABOVE REJECTION SHOULD BE WITHDRAWN BECAUSE A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN ESTABLISHED.

The above rejection should be withdrawn because the Examiner has failed to establish a *prima facie* case of obviousness for rejecting claims 1, 12 and 13. To establish a *prima facie* case of obviousness, the Examiner must meet three criteria: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to the skilled artisan, to modify a reference or combined reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art references when combined must teach or suggest all features of the claim.¹ Failure to meet any or all of the above criteria results in failure to establish a *prima facie* case of obviousness and the rejection should be withdrawn.

As discussed above, neither Ito nor the '271 Patent anticipate claim 1 because neither the '271 Patent nor Ito teach or suggest, "a resin injection

¹ See M.P.E.P. § 706.02(j)

portion located at a front end of the optical fiber and having a first resin and a second resin formed therein, the first resin forming a lens body, and the second resin forming a lens surface," as set forth in claim 1. Uno is directed to an optical device. The optical device includes a substrate and a first groove formed on the substrate. A second groove is formed diagonally across the optical fiber. An optical fiber is placed in the first groove and an optical member having a surface that reflects or diffracts light propagating through the optical fiber is placed in the second groove. A photodetector is placed at a position where the reflected or diffracted light is received.²

Uno, however, also fails to teach a "resin injection portion located at a front end of the optical fiber and having a first resin and a second resin formed therein, the first resin forming a lens body, and the second resin forming a lens surface," as set forth in claim 1. Therefore, the Examiner has failed to establish a *prima facie* case of obviousness in rejecting claims 5-18 because even assuming *arguendo* that Ito or the '271 Patent could be combined with Uno (which Applicants do not admit), the combination would still fail to teach all features of claim 1. Withdrawal of this rejection is requested.

CONCLUSION

In view of above remarks, reconsideration of the outstanding rejection and allowance of the pending claims is respectfully requested.


² Uno, Abstract.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Andrew M. Waxman, Reg. No. 56,007, at the number of the undersigned listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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